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WEST EUROPE REPORT SCIENCE AND TECHNOLOGY

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BIOTECHNOLOGY

BRIEFS

NOVO BIOTECHNOLOGY PRIZE ESTABLISHED--The Danish firm Novo Industri A/S has lately decided to establish the "Novo Biotechnology Prize" in the amount of 15,000 Danish kroner. It is to be awarded every 3 years for an outstanding contribution to biotechnology. Prof Kei Arima of Tokyo was chosen as the first recipient of the prize in recognition of his eminent achievements in microbiology and industrial enzymology. The Danish firm is the world's foremost producer of enzymes for industrial use and the second largest producer of insulin preparations. It sells its products in 120 countries and maintains research and production facilities in Denmark, Switzerland, France, South Africa, Japan and the United States. 1982 was a very successful year for the company. Turnover rose by 22 percent to 2,718 million Danish kroner, while net profits increased by 50 percent to 512 million Danish kroner. /Text/ /Duesseldorf CHEMISCHE INDUSTRIE in German May 83 p 241/ 11698

CSO: 3698/391

ELECTRONICS

NORWEGIANS REPORTEDLY DEVELOPING WORLD'S FASTEST COMPUTER

Oslo ARBEIDERBLADET in Norwegian 28 Jul 83 p 11

[Article by Harald Stanghelle]

[Text] Norwegian researchers have developed the basic elements of what will be the world's fastest computer.

During the past 4 years, a total of 25 to 30 researchers have worked to develop a computer facility that, among other things, will revolutionize the monitoring of large sea areas. For the first time, it may be said that every corner of the earth's surface will be monitored.

This work is under the leadership of the Defense Institute on Kjeller. A totally new type of computer is being developed. It will be capable of processing radar information from satellites.

It takes today's computers 700 hours (an entire month) to process radar information from a satellite to produce a usable picture of an area measuring 1,000 by 100 km.

With the system developed by the researchers on Kjeller, the same operation takes only 1 hour.

Satellite Pictures Created Need

"The American Seasat satellite project of 1978 illustrated the need for the work we have done," research chief Henry Kjell Johansen told ARBEIDERBLADET.

"Seasat made it possible to obtain pictures of the earth's surface via satellite, but there were no computers capable of making these pictures useful for military and civilian purposes."

What was needed was a special computer system with calculating and speed capabilities of previously unheard-of proportions. All existing computers were much too slow. The researchers at Kjeller took on this challenge.

"We had previously worked with a computer structure that looked promising,

under the leadership of researcher, now professor, Yngvar Lundh. It was a system with many smaller computers linked together to form a supercomputer," research chief Johansen said. He added:

"We had the right structure, but we had to make it 100 times faster. This was made possible by new technology."

Successful

The research team was successful.

"Now we know how to do it. The concept and the critical components have been developed. Now we must construct and test the system," researchers at Kjeller said.

According to plans, their work will be completed in 1985.

At that time, a prototype will be ready. The project will cost a total of about 50 million kroner.

Of the many researchers who are responsible for this pioneer work, over half are associated with the Defense Research Institute. But they have worked together with researchers from Norsk Data, Norsk Regnesentral, ELAB, and Oslo University.

"Cooperation involving various companies and institutions has been extremely necessary and it is interesting that it has worked so well," the Kjeller researchers said.

Tremendous Need

Thus, for several years it has been possible to receive satellite photos of enormous areas. But "reducing" them to a usable size has taken so long that the photographs could no longer be used. Now it seems that the Kjeller project has solved this problem.

Norway is extremely interested in this. In the past, it has been impossible to monitor all our sea areas, which total 2.5 million square kilometers.

"The need has been there a long time, from both a military and a civilian standpoint," ARBEIDERBLADET was told.

Coast guard work, fishing, oil spills, sea conditions, and information on special current conditions are some applications that have been mentioned.

Soon all this can be seen on computer-processed satellite photos only 1 hour after the pictures are taken.

Norwegian Computer Industry

The Kjeller project also will influence the Norwegian computer industry.

The European Space Administration (ESA) already has expressed interest. In the future, the Norwegian computer industry will be involved in this field.

It is one industrial group that has gained more and more international acceptance in recent years and sees great possibilities for the development of new computer technology. The completion of the Kjeller project will mean that, in this area, Norway will be ahead of such computer-producing nations as Japan and the United States.

And this is attracting attention.

Space Administration

This fall parliament will decide whether or not Norway will become a full member of the European Space Administration (ESA).

In June a committee under the leadership of director Finn Lied presented its report on satellite telemetering to the Environment Ministry. If Norway agrees to participate in American satellite projects, it will mean that Norwegian researchers will gain direct access to signals from the future ERS-1 radar satellite. Only then will the new computer system come into its own.

The Kjeller research team is especially anxious to hear the decision made by parliament.

9336

CSO: 3698/388

ELECTRONICS

FEW FRENCH ELECTRONICS FIRMS ESCAPE ECONOMIC CRISIS

Paris ELECTRONIQUE ACTUALITES in French 3 Jun 83 p 16

[Article by Olivier Picon]

[Text] Electronics firms, which for a long time were to a large extent relatively immune from the economic crisis, are now more and more beginning to suffer from the consequences of this crisis. For the top-ranked companies which we have analyzed, slumps or declining profits have multiplied.

The fact that a certain number of high performance companies are still in good economic health can no longer conceal the fact that no sector of the economy is now safe from accidents. Even though the figures on which we are basing this report are in many cases still provisional or approximate, because of the traditional slowness of French companies in publishing their consolidated results (that is, valid for their entire group, including subsidiaries), the conclusions we can draw now are quite reliable.

The causes of the poor year that many companies had in 1982 are well known. Still, it may be of use to mention these causes once more.

a. Growth often slowed down or even turned around. Such a change in trends is extremely hard for companies used to very rapid expansion rates to "digest." These companies have great difficulties in suddenly spreading out their costs over a stagnating production, costs that are still being driven upward by their initial impetus.

b. Social costs, such as employee benefits, have become more expensive with the 39-hour workweek, the fifth week of paid annual leave, and the increase in social contributions.

c. The 4 to 6-month price freeze and the fact that businesses have had to pay the 1 percent TVA [Value Added Tax] increase sharply cut into profit margins in France in the second half of 1982.

d. Abroad, the overvaluation of the franc until the monetary readjustment in June caused problems with exports, and often forced our companies to sell at a loss in markets with a strong currency, such as Germany, so they would not lose their positions in these markets.

e. Financing costs have continued to be a very heavy burden for companies with any amount of indebtedness, despite the very slight decline in interest rates.

f. A large number of companies have had to meet some exceptional costs, generally termed "restructuring" costs. These include the costs of liquidating unprofitable activities, layoffs, or in the best cases, paying the cost of solidarity contracts designed to replace older personnel with younger employees. As these costs are considered exceptional, or one-time costs, in principle they should not recur. But in fact, as one company's financial director told me, you can never be sure that such exceptional losses have actually come to an end. For the economic crisis has increased the number of unpleasant surprises and has often made new employee cutbacks necessary.

The companies which had a bad year in 1982 clearly illustrate this series of handicaps which has hurt the entire French economy, even though some of their difficulties have been caused by their own, inhouse problems.

The Thomson-CSF Decline

Thomson-CSF has had another very bad year, even worse than 1981. Its losses should be about 2.15 billion francs. This is worse than all the forecasts. The magnitude of this loss can be explained essentially by the firm's approximately 800 million in exceptional deficits. This deficit was caused primarily, it seems, by an attempt to clean up the balance sheet, by "lumping together" all the expected losses for the next few fiscal years. For example, there are a good many reserve funds listed, penalties for probable delays in delivering telephone equipment, and amortization costs for items whose value in the balance sheet no longer corresponds to their actual value.

It is known that Thomson-CSF's difficulties are due essentially to the slump in its medical electronics activities and to the large deficits it has had to face in its ill-fated diversification in the telephone sector. The field of medical electronics has suffered a great deal in the current economic crisis. But the crisis has also struck at the heart of CSF, professional electronics, by causing a slowdown in the firm's expansion over the past 2 years. So the profits of this part of the company, which had been substantial until then, have reportedly not exceeded 150 million. This activity is destined primarily for military usage.

However, the orders received do suggest a very strong upturn in this sector in 1983-1984. As the telephone sector should either reach an equilibrium or be close to it, the firm's prospects would actually seem rather encouraging, if the medical electronics sector did not threaten to continue to be a heavy burden, unless some arrangement can be worked out with another company to ease this difficulty.

It has often been said that Thomson-CSF has painted its losses darker than need be, so that in 1983 or by the latest, in 1984 its recovery could seem even brighter. And it is true that the company's exceptional losses do seem to have been included to the utmost extent possible. But, as has been said before, what is exceptional in this area very often tends to become usual. That is why it is hard to maintain that the company's losses have been artificially inflated, as we can not be sure that the future does not hold more unpleasant surprises in store for Thomson, considering the difficult economic situation.

The consequence of Thomson-CSF's losses for its nationalized parent company, Thomson-Brandt, is a deficit of about 2.2 billion, which reflects almost entirely the drain created by its subsidiary, for Brandt's own business activities, essentially in the "mass market" area, showed a pretax, estimated profit of about 130 million.

Another company in a slump in 1982 was Matra, which until then had had an astounding growth. In fact, the firm fell victim to its own diversification. Its own operating profits from its military and space activities even took a leap upward, rising from 417 to 815 million francs. But after all the financing support required by the dismal state of its subsidiaries, the

parent company's profits were down to 153 million. And the consolidated accounts will be worse. Profits might be only about 20 million francs.

In fact, Matra has suffered from the chaos affecting its subsidiary, Manurhin, from the problems of Peritel, and from its involvement with automobile electronics, that is, from Jaeger and Solex, which Matra had hoped to lead more quickly away from conventional production to the production of electronic products, and finally, from its activities in the area of automobile manufacturing.

The good results of its aerospace and military activities, which are continuing in 1983, and the recovery of some of its subsidiaries, do suggest that Matra this year may end up with profits similar to those shown during the years of its cloud-free prosperity.

Profits at Crouzet have also been down. Last year its good level of earnings was only maintained by means of the SFENA [French Air-Navigation Equipment Company] contribution. Despite the restructuring of this participation under the guidance of the SNIAS [National Industrial Aerospace Company], the Valence firm still holds, either directly or indirectly, a majority of the SFENA stock, and it could expect to receive its support in maintaining a decent profit level. But unfortunately, the SFENA has had to cope with the loss of a good part of its principal market, the Airbus market, and its profits have dived from 95 to 17 million francs. Crouzet has slightly improved its own profits (about 7 million), but because of the losses of some of its subsidiaries, its consolidated profits should only be about 2 or 3 million. It is true, though, that among the exceptional features of its accounts for 1982 are payments for employee layoffs, paid under an agreement with the national employment fund. This amounted to nearly 17 million francs.

Another of 1982's disappointments was the performance of the SAT [Telecommunications Corporation], whose operating profits were cut back 85 percent. The essential cause of this poor performance was the cancellation or delay of PTT [Postal and Telecommunications Service] orders. SILEC, which was acquired during the year, had decreased earnings of the same nature, and for the same reasons, so that the SAT's profits should amount to only a few million Francs. Electronics contracts for armament have not yet begun to show a profit, and the future cable network market is not bringing in anything positive for the moment.

The earnings of another company belonging to the G3S group, like the SAT, Signaux, are still close to zero. Although this firm is handling them better, financing costs there are still a burden, as they are at the SAT. It is only through their participation in SAGEM [Company for General Applications of Electricity and Mechanics] that the Signaux company may show a consolidated profit of about 25 million.

The SFIM [Measurement Instruments Production Company] is another firm being hurt by financing costs that are too high. In addition, its activities in aeronautics are suffering from the slowdown in helicopter sales. But, through the support provided by firms bought out in recent years to form a group, the SFIM's consolidated profits are up very slightly, at 34 million.

The SFERNICE [expansion unknown], which for a long time was considered a growth company, for the second consecutive year has had a slight downturn in its profits.

Some Companies Are Still Growing

Fortunately, there are still some firms, which, despite all the odds, are keeping up a rapid growth. SAGEM [Company for General Applications of Electricity and Mechanics] is a good example of this. However, because of the high costs facing businesses today and the cost of research, the firm's real profits grew only by about 20 percent, for total revenue of 30 percent. With the modest contribution of the SAT, the consolidated results should come to about 60 million francs.

TRT, which has become one of the stars of the Stock Exchange, has also shown a growth of 30 percent in its invoicing and 15 percent in its profits, with about 56 million. But the 1983 fiscal year looks better than at SAGEM, for a 25 percent expansion is expected for TRT. Partly because of its good financial situation, Intertechnique has been able to increase its profits (up 16.6 percent) slightly more than its sales (up 14 percent).

Another firm maintaining an unprecedented growth is Legrand, which should earn nearly 150 million. After its period of recovery, Mors is now ranked as one of the top-performance companies. Its pretax profits grew by 60 percent, though, it is true, with the use of capital increased by an expanded stock issue. But as the company is one again starting to pay taxes at the full rate, its net earnings show an advance of only 13 percent.

Merlin Gerin has become one of the favorites of the Stock Exchange. Its operating profits grew by nearly two-thirds last year, and in spite of a solidarity contract which cost the company nearly 48 million, its net declared profit was up 26 percent, with 102 million, which in reality should actually be closer to 135 million. For 1983, a 20 percent increase is expected.

There are still a few more growth companies which have either staged or confirmed their recovery. But these returns to operating in the black have often cost a great deal in terms of jobs.

Radiotechnique is a good example of this. 1981 was a bad year, and the "restructuring" plan of RTC (Radiotechnique Compelec) did help this subsidiary to regain its health. Therefore, the decline in the parent company was more than offset, and the consolidated earnings increased by 47 percent, with 81 million.

SEB and Moulinex have also emerged from an unhealthy situation. For the second straight year, SEB had increased profits (up 30 percent, with 83 million); Moulinex also doubled its profits with 53 million.

Telemecanique is another good example of a policy designed to maintain profits even if growth proves elusive (see ELECTRONIQUE ACTUALITES of 22 April 83). Its real profits more than doubled with 128 million, thus wiping out its previous decline.

PM Labinal, because of its aeronautic activities, an improved position in its automobile-related sales, and its new subsidiary Microturbo, more than tripled its profits (with nearly 48 million), which had slumped sharply the previous year.

CIT-Alcatel, although it has not had very great difficulties in the past, can still be classified among the companies that are recovering. The parent company has now fully digested its conversion to the production of entirely electronic telephone equipment, which had affected its accounts, primarily in 1980. However, some subsidiaries (Roneo, Friden, and CGA) are still having problems in 1982, as they did in 1981. The parent company has increased its operating profits by 14 percent, and its real consolidated profits will be sharply up, for the amount related to CIT in the earnings of companies in this group. It might be about 100 million, instead of 75 million, as it was last year.

A subsidiary of the nationalized CGE [General Electric Company], like CIT-Alcatel, Alsthom-Atlantique, which had experienced a crisis some years ago, has increased its parent company profits by nearly 20 percent, and its consolidated earnings should be about 15 percent better, which would yield more than 270 million.

The CGE may also announce a profit for its group at least equal to last year's, and close to 600 million francs.

7679

CSO: 3698/376

ELECTRONICS

DP COMPANY LEAVES SWEDEN TO ESCAPE NEW TAX

Stockholm DAGENS NYHETER in Swedish 30 Jul 83 p 6

[Article by Anders Nordstrom]

[Text] The Datatronics computer company is leaving Sweden to escape the wage-earner funds. Most of the company's development work is being moved to the United States. At the same time, the company is being listed with the stock exchange in the United States, while it refuses to be listed on the Stockholm Stock Exchange. This means that in the long run most of Datatronics' activity will be moved from Sweden to the United States.

"We assume that the proposed wage-earner funds will be put into effect. The increased tax burden that will result has convinced us to move," executive vice-president Mats Gabrielsson said.

Datatronics now has about 200 employees and is one of the most rapidly expanding computer and electronics companies in the Nordic countries. Total sales this year are expected to be about 450 million kronor, compared to 163 million in 1982.

"Edin's new tax will mainly affect two types of companies--realty companies and rapidly expanding companies that have a small capital base," Mats Gabrielsson said.

Shuffling Money

"I have no complaint about taxing realty companies. Making large profits by shuffling money back and forth does not help Sweden."

"But I cannot understand why companies such as ours must be so hard-hit. After all, they say they want to help companies of the future, such as Datatronics."

Datatronics is being hit relatively hard by the new tax resulting from the wage-earner funds because the company has little capital, relative to its profits.

According to Edin's proposal, companies would be protected from seeing their capital eaten up by inflation. Thus, if the inflation rate is 10 percent, a corresponding amount may be deducted from taxable profits.

But if a company has little capital relative to its profits, the deductions will be extremely small. Thus, most of the profits will be taxed.

7 Million More

"According to our calculations, if the wage-earner funds had been in effect this year we would have paid between 6 and 7 million kronor more in taxes," Mats Gabrielsson said.

"That means we would pay as much in extra taxes as many of the country's truly giant companies. That is unreasonable."

Once Datatronics has carried out its plans, it will have only an organization for distribution and sales in Sweden. Because of the company's rapid expansion, however, the number of employees will not be reduced, even though the development side will be moved to the United States, according to Mats Gabrielsson.

The company's activities in the United States will be organized as a separate subsidiary that will pay no dividends to the parent company in Sweden. In this way, most of the profits will not be taxed in Sweden.

Mats Gabrielsson would not say how many jobs would be created in the United States as a result of the expansion.

"It is a considerable number. I do not wish to be more precise than that. That could help our competitors," he said.

9336

CSO: 3698/387

ELECTRONICS

'MICROELECTRONICS PLAN' OUTLINED FOR 1983-1986

Four-Year Funding Outlined

Paris ELECTRONIQUE ACTUALITES in French 10 Jun 83 p 20

[Article by J. P. Della Mussia]

[Text] The content of the French microelectronics plan for the 1983-1986 period does not simply maintain the continuity of the program undertaken during the first integrated circuits plan. It also contains some new approaches, designed both to consolidate what has been achieved and to make use of these achievements on an industrial scale (see part II of this article).

Of course, the concept of a microelectronics program as it was presented in an idealistic manner over a year ago could have been realized more fully in terms of components. But circumstances finally made the nationalized companies give more priority to the management interests of their companies than to the attainment of objectives that would certainly have been desirable for the users, but which would sometimes have been relatively expensive for the companies involved in relation to the benefits that would have been derived from these developments. These benefits amounted essentially to increased independence, which would be useful primarily in case of a political crisis or in times of shortages. So the bases for this program have remained fragile, to say the least, in terms of materials and equipment used to manufacture components.

However, many conditions have been met so that the electronics industry in general can now benefit from the contributions made by a microelectronics industry that is relatively advanced in terms of components and services. The most important factor is that only an industry competitive on a worldwide basis can hope to grow in the years to come.

We should point out, though, that it is not just the components companies being directly aided by the government that are helping to provide a sound basis for our electronics industry. An example of this is Texas France for voice processing circuits, for "Antiope" circuits, or for some automobile circuits. At the other end of the scale, another example is ATAC Diffusion (which is now beginning or which will soon begin to receive some aid) for its entire line and for its preprocessed circuit services (prediffused and "pre-characterized" circuits).

More Than Quasi-Continuity

The first French integrated circuits plan came to an end at the close of 1982. Its goal had roughly been achieved, since it enabled France to catch up its technological lag in MOS and C-MOS, to set up facilities for designing integrated circuits in order to keep the systems skills of the equipment manufacturers on French soil, and then to install production facilities so that France will have a mass production capability for these circuits, particularly for memories. This final objective was intended to provide a certain degree of independence for France for circuits that are widely used. Such independence will be most useful during periods in which worldwide demand exceeds supply, or when delivery times are too lengthy for the users.

But the most difficult thing still remains to be done: to take action so that the industrial complex created can balance its books. In 1982, losses of the French firms involved in this plan reportedly reached 400 million francs. Losses will probably be about the same in 1983, since these companies will have to continue to expand, no matter what the current economic situation.

In July 1982, the new group installed at the ministry of industry announced the followup for this plan, though with very little precise information. It was reported only that this followup would be a microelectronics or even a components plan. Official documents have mentioned actions planned for VHF components, power components, and GaAs circuits (see ELECTRONIQUE ACTUALITES, 3 Sep 82). Some of these actions had already been begun, particularly for bubble memories, machines, GaAs CI [Integrated Circuits], materials, and an item called "development of demand" had already been planned (ELECTRONIQUE ACTUALITES, 13 Mar 82). Then it was announced during a speech that linear circuits would be given special aid. And then in December 1982, Mr Hirel, director of the DIELI [Bureau

of Electronics and Data Processing Industry], described the spirit of the new 1982-1986 plan (see ELECTRONIQUE ACTUALITES of 17 Dec 82): "Our policy will now be centered on products designed and developed in liaison with the users..." The priority now being given to linear circuits, and in particular to mass-market linear circuits, is well within the context of this plan, and it is quite logical. Experience does indeed show that a company can succeed with a particular type of component only when it has within the country an extensive market whose range is international (for France, this means the military, telecommunications, and to some extent information systems markets). Unfortunately, our mass-market production is not able, except in some specific cases, to operate on an international level based on our own skills in this field.

So in this first phase the essential part of the potential market for these circuits will be only about 1/3 of the European market (the rest is covered in an almost captive market by Philips and by the Japanese). Thomson will have a great deal of work to do if it is to catch up to ITT Semiconductor/Freiburg for complex mass-market circuits and, to a lesser extent, if it is to catch up with SGS [General Semiconductor Co.] for power and high-voltage circuits. But this comment, which is valid only for the short term, does not in any way detract from the other advantages of this operation, such as: the contribution of experience with the large-scale production of integrated circuits, a reduction in the number of circuits that must be imported, and some basic support for new general-public sectors. This operation does not at all infringe financially upon other microelectronics actions. Fortunately, the new political imperatives of this plan--to bring into equilibrium the balance of trade in integrated circuits, to provide new jobs, and to master new technologies--do not at all contradict the earlier goals: to keep the systems experience of the equipment companies on French soil, to install production facilities for the purposes of independence, and to make up for our technological backwardness in this field).

The new aid allocated for microelectronics will go in large part to linear integrated circuits, but the other sectors will have their aid budgets follow at least the rate of inflation. Unfortunately, we can not be more precise about integrated circuits, as comparing one plan with another is quite difficult in the absence of detailed statistical data. We can say, though, that the 1982 interim microelectronics plan did call for a budget of 480 million francs for R and D (of this, 240 million was earmarked just for integrated circuits), plus 340 million for investments (of this amount, 300 million was intended just for integrated circuits).

4.5 Billion Francs Over a 4-Year Period

The first pure integrated circuits plan had covered a 4-year period, and in 1982 francs, amounted to a total of about 1.2 billion francs (300 million per year), but a great many investments were included in this figure. The increase was already undeniable in 1982, even if microelectronic non-integrated circuit devices, which were not included in the first plan, were formerly aided outside of the plan. The 480 million francs scheduled for research and development for 1982 was finally cut to 420 million, probably as a result of the overall budget cutbacks adopted at the end of 1982. We don't know what has happened to the investment aid allocations. The 700 million scheduled for research and development for 1983 is, however, fairly comparable to the 420 million in 1982, even though the 1983 figure covers a somewhat broader concept of R and D, and in addition some CAO [Computer-Aided Design] and discrete power unit actions are now included in the plan. Outside of research and development, it is even more difficult to make comparisons, for the principal participants in the plan are at least partially nationalized, and there will be capital infusions in order to wipe out losses and enable investments to continue. We believe we can say that the entire envelope of aid scheduled (but not budgeted) for French microelectronics during the 1983-1986 period will be at least 4.500 billion francs. Of this figure, 2.550 billion will be used for R and D, 900 million will be used to cover losses, and 1.025 billion for investments for nationalized companies. For 1983 alone, this aid will reportedly be 1.400 billion, with 700 million of this figure earmarked for R and D, 400 million for covering losses, and 300 million for investments. We see, then, that some substantial aid has been planned for 1983, with aid allocations to decrease slightly in later years. The government will not finance everything, though: semi-official estimates cite the total needs of companies operating under the 1983 plan at 410 million for CI, 315 million for microelectronics excluding CI, and 600 million for investments, or, over the 1983-1986 period, 1.840 billion, 1.290 billion, and 2.050 billion, respectively.

1.290 Billion Francs for Non-CI Research

We also believe we know the distribution of aid scheduled for this period (we don't know if this is what is actually budgeted) for actions excluding discrete and integrated silicon:

- a. 280 million for GaAs CI (70 million in 1983);
- b. 200 million for machines (50 million in 1983);

- c. 80 million for bubble memories (20 million in 1983);
- d. 60 million for materials (15 million in 1983);
- e. 100 million for assembly (this item is for a program designed to build up an automated assembly unit in France, but we don't know the status of this project);
- f. 170 million for CAO VLSI [Very Large-Scale Integration] (20 million in 1983) outside of the general CAO plan;
- g. 200 million for aid in utilisation (200 million in 1983);
- h. 200 million for basic research (50 million in 1983).

Between now and 1986, the government wants the French integrated circuits market, which is 4.650 billion at this time, to be covered by production in France. The share corresponding to companies in which the majority of the capital is French is 3 billion francs.

For linear circuits alone, French production should be 1.640 billion, with a market amounting to 1.1 billion francs.

For bipolar logics, French production should be 90 percent of the market, estimated at 700 million francs for 1986, and the production of bipolar memories should be 140 million, or 50 percent of the market.

For MOS logic circuits, French production should be 865 million, equivalent to the market demand. Production should be 750 million, or 70 percent of the market demand, for standard circuits such as memories.

Producing 94 Percent of the Microprocessors Market in 1986

The goal for microprocessors is to produce a value of 605 million, 94 percent of the 1986 market. (These figures take into account a special effort made on 4-bit microprocessors, which was not reported to us officially).

For GaAs integrated circuits, the goal is to have a French industrial production by 1985.

For bubble memories, the government hopes that France's production will cover 10 percent of the world market, estimated at 3.4 billion francs for 1987.

700 Million for 1983

Paris ELECTRONIQUE ACTUALITES in French 10 Jun 83

[Article by J. P. Della Mussia]

[Text] This year the government will grant 700 million francs to support research and development in microelectronics. This is a considerable increase over last year (420 million), and it confirms that microelectronics has top priority in what is called "the electronics program."

The greatest innovation in the distribution of the funds allocated is the top place reserved for linear integrated circuits, leading the funding allocated for MOS and C-MOS digital circuits. This priority was established for the following two reasons:

- a. To set up a healthy components foundation in order to create a mass-market industry.
- b. To make semiconductor investments profitable in one specific area and not allow such investments to be scattered about, when a direct monetary return is desired.

The current plan is a microelectronics plan and not a components plan. The actions to be undertaken in the field of passive components are still under study, but it has already been decided to grant over 100 million francs (in addition to the 700 million) to this sector in 1983.

The following article was based on official information obtained from the DIELI. The reticence of the people with whom we spoke about citing any actual figures led us to publish a supplemental article based on non-official data (but which are probably very close to the truth), which our readers will find on the last page [published as the first part of this article].

SGS in the French Plan

On 28 July 1982 a decision was made to set up a coordinating committee for the electronics program under the direction of the General Department of the Armed Forces, the General Department of Telecommunications, and the Bureau of Electronics and Data

Processing Industry and research component of the General Department of Industry. Based on the proposals developed by this committee, and on the needs expressed by each party, a multiyear research and development program has been established for components. This program shows both an intention to mass produce certain integrated circuits, and also to closely link components actions with the needs of equipment manufacturers, so that some French markets may serve as a springboard for the development of components industries that will be competitive all over the world.

This intention is particularly valid for the mass-market and automobile electronics sectors. These are two sectors with a high priority level, sectors which need the most advanced linear or pseudo-linear circuits if they are to have an impact on the world market. That is why the "slot" of linear circuits was selected as a priority sector in order to quickly achieve a level of profitability in the field of integrated circuits. "Finally, we have to get some cash flow with these circuits." This selection has an added advantage: the mass-market and automobile sectors are markets which, just in France alone, will call for a large volume of production.

This will bring about industrial competence with large-scale production, which may then be of use for other integrated circuits.

At the present time, the French import-export balance in linear circuits is in a state of equilibrium. By 1986, at the end of the new plan, France should definitely be an exporter of these circuits.

The participants in the linear program will be Thomson-CSF, SGS (its Rennes plant), and RTC. Motorola's work in this field in Toulouse will be appreciated, but not aided. (The aid allocated to SGS should induce the company to expand its Rennes facilities from a 3-inch to 5-inch standard and to set up a linear circuit design center).

Right now, 80 percent of the linear circuits produced in France are for the industrial market. Between now and 1986 the balance will shift in favor of linear circuit production for the mass market. But industrial linear circuits will still be actively supported.

Under this plan, RTC is to set up facilities in Caen in order to increase its production of linear circuits.

"Medium-Level" Effort Made for MOS

In order of importance, the second sector being supported is that of MOS and C-MOS (unfortunately, we have not been able to obtain percentages of funding for each field). For these circuits, the aid is designed essentially to ensure continuity in relation to past actions. The DIELI has emphasized that it does have a policy in this area, but it will not engage in direct interventions in relation to industry, even with nationalized industries. The nationalized industries may develop whatever circuits they choose. But they will not be given aid for these circuits if they are not included within the plan set by the government.

For memories, it is hoped that there will be a development in France of EPROM, EEPROM (first at Eurotechnique) and of C-MOS static memories (first at MHS).

In the area of microprocessors, the products affected are the 80, 86, and 68,000 families. The 16,000 family will not be supported directly but will, in principle, be approved by the appropriate agencies.

In the next sector, digital bipolars, the increase in the program from the preceding year corresponds approximately to the rate of inflation. In this area, the bulk of the aid will go to the RTC this year, but MHS should also benefit from it. A transfer of Harris technology to France is planned for the end of 1983 or early 1984 (production will be done on the basis of units supporting prediffused insulating cases produced by Harris).

The government hopes to increase the rate of coverage in this field from 35 percent in 1982 to 80 percent in 1986.

Prediffused elements are also part of a development program in this plan, but the actions are linked to a CAO-VLSI program, most of which is not included in the figure of 700 million francs mentioned earlier. In this plan, MHS is now being aided in order to develop 2.5 μ m circuits with a metalized layer. For Thomson, the situation is more uncertain, as a specific plan for the development of prediffused circuits has not yet been presented to the DIELI.

Alcatel Semiconductors (which, we have just learned, has disposed of its shares in SPI) is now in a period of "reflection" about its future policy on prediffused circuits.

For GaAs circuits, the actions being supported by the DGT [General Department of Telecommunications] and the DGA [General Department of the Armed Forces] should help to stabilize technologies and also to develop specific circuits (memories and UAL). Thomson will receive most of this aid, but RTC should receive enough to encourage it to continue its work in this field.

In the area of bubble memories, there is support action planned so that the SAGEM [Company for General Applications of Electricity and Mechanics] will develop both a 1 M bit memory and also a cassette reader.

For materials, we are somewhat tempted to summarize the situation by the expression "the will is there, but there are few resources in industry." The government would like to have a production of single-crystal silicon in France (necessarily in cooperation with a foreign partner, since we would be starting practically from zero) but, for the moment, nothing has yet been set for the short term. Nor has anything yet been done about photosensitive resins since the failure of the Rhone Poulenc operation.

Nor has anything been done in the area of ceramic substrates.

However, a consultant's report on interconnections in general will be reviewed in June and "major" funding is scheduled for this area starting in 1983.

And finally for GaAs single crystals, the government would like the development programs of RTC, Thomson-CSF, and of the LETI [Electronics and Data Processing Technology Laboratory] to join together for production at Crismatec.

Machines: What Will Thomson Do?

In the area of machines, the government does not want to speak of a plan (which contains a multi-year concept) but rather of an action program. Thomson's recent decision to abandon sales of its electronic masker and its photorepeater has obviously taken away a good part of the actions planned for machines. But other developments have not been halted. Thomson-CSF has kept about 10 people (of a total of 25) working to develop a very high resolution version of an electronic masker. And Mr Lacombat, who was in charge of the photorepeater program, is still there.

Outside of Thomson-CSF, other actions are continuing. These include the following programs: GCA-Matra, Riber (molecular stream epitaxy), CIT-Alcatel (etching: with whom will this company work to expand its scope of activity in this area?), and Semy-Engineering (furnaces), in addition to specific but limited aid being provided to Nanomask (masks), to AET and SET (alignment).

We have already mentioned the appearance of a heading entitled "utilization policy," designed to "microelectronize" industries that would benefit from an increased use of electronics, but which are hesitant to make this switch because of a lack of knowledge of the problems involved, a lack of confidence, or any other reason. This action program is now getting underway, and the government is providing some aid for both the conceptualization and for the development of the program. We will discuss this in more detail later.

There is also an important action program designed for discrete power units. The companies involved are: Thomson-CSF, RTC, and Texet. The component being given most support is the MOS power unit. There are still some questions being raised about the wisdom of developing GTO units.

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CSO: 3698/378

ELECTRONICS

TELEFUNKEN ELECTRONIC: NEW PARTNERSHIPS, ACTIVITIES

Essen ELEKTRONIK-APPLIKATION in German May 83 pp 13-14

[Text] After the former business area of electronic components was eliminated from the conglomerate of AEG Telefunken and was introduced into the newly-founded Telefunken Elektronik GmbH, new cooperative partners were added.

The Telefunken Elektronik GmbH was founded on 1 November 1982. AEG Telefunken and United Technologies each have a 49 percent interest therein; the remaining two percent is held by the South German Ind.-Beteiligungs GmbH. On 1 March 1983, the Eurosil Electronic GmbH was then founded. The interests are 43.6 percent with Telefunken Elektronik, 43.4 percent with UTC, and 13 percent with the Diehl Group. Telefunken Elektronik and Eurosil Electronic form a strategically and technically closely enmeshed association. The 100 percent subsidiaries Telefunken Elektronik, Austria, and Telefunken Semiconductors, Philippines belong to the Telefunken Elektronik. The major research enterprise BESSY is directed towards sub- μ m structures, and Telefunken Elektronik has a 15.2 percent interest in this enterprise. The most important products of Telefunken Elektronik are individual semiconductors, optoelectronic components, integrated circuits, solar cells, layer circuits, and subassemblies.

Of the eight plants of Telefunken Elektronik and its subsidiaries, the plants in Heilbronn, Manila, Vöcklabruck and Braunau are directed towards semiconductor technology, the plant in Nuremberg to layer circuits, and the plants in Ingolstadt, Gräfenberg, and Steyr to subassembly technology.

The emphasis of Eurosil Electronic with its new plant in Eching and Munich will be placed on CMOS and CMOS/VLSI products and technologies.

Research and Development

The constantly rising complexity of integrated circuits presupposes a constant reduction of structures and thus an increase of packing density. Starting from the 4 μ m standard process, the development of a 2 μ m CMOS processor is being pursued at this time. This project is funded by means of the Federal Ministry for Research and Technology, as are other research projects in the area of x-ray lithography, which in the long term will make possible the generation of structures in the sub-micron range (below 1 μ m).

By a five percent interest in BESSY (Berlin Electronsynchrotron), Eurosil Electronic has access to its research results. Furthermore, there are intensive contacts with institute of higher education, as well as with the Institute for Solid State Technology of the Fraunhofer Society in Munich.

Production

A new semiconductor plant in Eching was built according to the present standard of knowledge, and its equipment and clean room design corresponds to the International Standard. On an area of about 1800 m², a wafer capacity of 10,000 units per month was created. The device park for disk production consists, for example, of nine projection illumination systems, 32 microprocessor-controlled diffusion tubes, five plasma etchers, and two ion implanters. All the production steps are here controlled electronically. Disk production is housed in a fully air-conditioned clean room, controlled to a precision of $\pm 1^\circ \text{C}$, with freedom from dust of cleanliness class 100. The actual process areas are even cleaner from dust by more than a whole order of magnitude. Eurosil Elektronik GmbH is demonstrating its environmental responsibility by separate supply and waste disposal buildings, equipped with the necessary apparatus. With such equipment, Eurosil Electronic is producing products with a total yield of about 60 percent. Japanese companies are known to yield 45 percent, and US companies 40 percent. Here, it should be mentioned that the products are only conditionally comparable. The production volume for 1983 will amount to 100 million units.

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ELECTRONICS

BRIEFS

SIEMENS VLSI PLANT--At present, Siemens' most advanced semiconductor plant is its production facility in Villach, Austria. Constructed at a total cost of DM120 million, DM70 million has been invested in the plant over the last three years alone. The VLSI center, which covers an area of nigh on 8,000 square meters, produces 16-K and 64-K memories and microprocessors by the million. At the same time, the fact that 750 people are employed there makes the Siemens plant an important economic factor in the Austrian state of Karnten. Attached to the center is the EZM, a development center for microelectronics, where VLSI circuits are designed. The Siemens' semiconductor fabrication plant in Villach was opened twelve years ago. Initially, discrete semiconductors (diodes) were assembled there. In the mid-seventies, assembly of integrated circuits was added to production. Nineteen eighty one saw the installation of a diffusion center for MOS-technology VLSI circuits. The current capacity of this production line is around 4,000 4-inch wafers per week. The Villach factory has all the latest equipment: besides diffusion ovens, several ion implanters, plasma etchers and metallization units have been installed. At the heart of the VLSI center are its wafer steppers for fully automatic exposure of the silicon wafers with 2-micron structures. These alone cost more than DM10 million. Automatic bonding machines are used to connect the chips to the package connections via fine strands of gold. This equipment enables Siemens to produce very high-quality VLSI devices. Currently, over a million memories are produced in Villach monthly. The memories at present being supplied to IBM as part of a three-year contract also come from Villach production. [Text] [Munich DATA REPORT in English Jun 83 p 30]

BRITISH ADVANCED MICROELECTRONICS, FIFTH GENERATION COMPUTERS--The British Government has just unveiled a plan to invest \$314 million over 5 years for a joint research program in the areas of advanced microelectronics and fifth generation computers. The program, which will combine private companies, university institutes and government research agencies, will have four areas of research: VLSI /very large scale integration/, man-machine interface, software and learning-based intelligent systems. The total expenditure over 5 years will be \$549.5 million, the additional 235.5 being provided by industry. The private companies participating in the program will receive assistance covering 50 percent of the total cost of the research project, while university institutes will receive 100 percent up to \$78.5 million. The foreign companies will have an opportunity to participate in this national program provided that they have a production unit in Great Britain, undertake to do research and make use of results there. The program provides for exchanges of knowledge and information at all levels between the various parties collaborating on a project and even, under reasonable circumstances, between the program participants. If the research generates a product the British Government will cede the manufacturing rights to companies capable of producing and marketing it. The English program will be coordinated by a directorate consisting of representatives of government and industry. /Text/ /Paris ELECTRONIQUE ACTUALITIES in French 27 May 83 p 16/ 12344

CS0: 3698/371

SIEMENS DEVELOPS THREE-DIMENSIONAL CAD SOFTWARE

Munich DATA REPORT in English Jun 83 pp 22-27

[Article by Reinhard Denner, Jurgen Gausemeier, Marion Mickisch-Henssler]

[Text]

Siemens has developed the software package CADIS (Computer Aided Design Interactive System) to facilitate industrial design using data processing systems. It runs on Siemens computers of the 7-500 and 7-700 systems in conjunction with the TRANS-DATA® 9731 Graphics Workstation. In the earlier two-dimensional version, CADIS-2D, the user had to define each view of and section through an object orthographically, whereas the new upwards-compatible CADIS-3D system operates three-dimensionally, i.e. the shape of an object can be represented isometrically.

A clear CAD concept

The most important form of information for industrial design and planning is graphical representation of an object. Rationalization of these activities by means of data processing (CAD-computer-aided design) calls for hardware and software which permit efficient generation and manipulation of images. The CADIS software package designed for these functions runs under the BS2000 operating system in conjunction with computers of systems 7-500 and 7-700 and the Graphics Work Station 9731.

The basic CADIS-2D system operates two-dimensionally, i.e. the user defines and plots the various views and sections of a technical drawing at his graphics workstation [1]. CADIS-3D is the next, upwardly compatible graphics stage in the overall CADIS system. CADIS-3D operates three-dimensionally, i.e. the user defines the shape of the object rather than individual views. The system automatically generates all two-dimensional views and sections and any isometric projections of the object that may be desired [3].

CADIS interfaces allow program modules to be linked for computer-assisted solution of further design and planning problems, such as strength calculations and production of machine tool (NC) programs.

Technical objects are three-dimensional in form. Description of the shape of an object for computer-aided design is therefore invariably based on a procedure in which all three planes can be defined. The object is described in terms of lines, planes or solids (volumes). The 3D system generates inside the computer a digital image or model of the object from graphic elements entered by the user [4].

By describing an object in terms of lines corresponding to its edges, a *line model* is generated.

This model consists of three-dimensional edges (K_i) and points (P_i) as well as the logical relationship between them.

If the description of the object involves interactive combination of individual lines to form planes, the result is a *plane model* which has

the same basic structure as the line model but also displays the planes (F_i) defined by the user. Models of this kind allow plane intersections to be computed automatically.

A description of the object in terms of volume elements results in a *volume model*, which is an exact representation of the shape of the object.

In contrast with the plane model, the surfaces of the object are generated by the system and assigned to individual volumes (V_i) or to the object as a whole. This procedure forms the basis of the CADIS-3D concept [4, 5]. It is characterized by a minimum of input commands and maximum user convenience, and includes features such as automatic

generation of volume interpenetrations and sections through solids.

Description and manipulation of objects with minimum effort

Description and manipulation of a three-dimensional object in two-dimensional representations invariably requires several orthographic views. To obtain these, the user divides the drawing surface into rectangular work areas (AFs) in which the main views, such as the front, side and top views, as well as oblique views, can be displayed.

In the CADIS-3D system, the main and oblique views are automatically generated isometric projections. Sections can also be depicted as main or oblique views. To describe component parts a work area can be provided with the following display specifications:

- Representation of all edges;
- Masking of hidden edges;
- Representation of hidden edges as dashed lines;
- Scaling.

In phase 1, the user sets up work areas AF1 and AF2. In AF1 the contour required for the profile is defined with CADIS-2D commands and the solid profile generated with a 3D command. The profile then appears automatically as a front view in AF1 and a side view from the left in AF2. The spatial location of the negative cylinder (required for the description of the bore) is defined in AF1 and AF2. Subtraction

of the cylinder from the original profile is automatically carried out by CADIS-3D.

In the second phase, the user defines two more work areas, AF3 and AF4. The solid profile is rotated in AF3 in such a way that the plane profile surface shown in distorted form in AF2 appears undistorted in AF3. In this way the user can easily define the second negative profile for the recess. Subtraction of one body from the other is again carried out by the system.

AF4 shows an oblique view, in which the hidden edges are automatically masked. To generate an oblique view of this kind, the angles of rotation of the part about the coordinate axes must be specified in the front view.

Another example shows the procedure used to position offset bores in a oblique, plane component surface (phase 1) as well as various other ways of manipulating work areas (phase 2).

Phase 1: Two holes are to be positioned on the oblique component surface shown in AF1. The component is then rotated so that this surface is reproduced without distortion in work area AF3. The user then defines both holes in AF3.

Apart from this, the representation shown in a work area or the work area itself can be enlarged or reduced by scaling.

Phase 2: To define the oblong hole, the user sets up a new work area AF3 parallel to AF1. The generating contour of this hole is then located on the corresponding plane component surface.

Every work area has its own local coordinate system, which is not normally displayed. If required, it can be made to appear on the screen by means of an information function. In AF4 the

local coordinate system of AF3 is shown relative to the component part. *Sectioning* is a important function for graphic manipulation of mechanical components and performs three tasks in the CADIS-3D system:

- Shape modification by clipping;
- Generation of sectional views for drawings;
- Generation of cross-sections for design and calculations.

A single section plane is sufficient to clip the upper part of a rotating object; it is defined by a line segment in AF1 and thus perpendicular to the plane of AF1. The result of clipping is shown in AF2. The clipped solid can now be combined with other solids or sectioned again.

AF3, for instance, contains a sectional view as is commonly shown in engineering drawings. The section plane runs through the axis of rotation and is perpendicular to the section plane defined in AF1. The cross-section shown in AF4 is a greatly simplified version of the sectional view in AF3; only the shoulders of the cut are shown. All other faces of the rotating body are irrelevant to this representation.

The views of the object represented in the various work areas can be further processed with the aid of CADIS-2D commands. A detail drawing, or assembly for example, can thus be produced in line with standard drawing practice. For this purpose the drawing format is overlaid, the title block filled in and the main view dimensioned. If extra clarity is desired, the oblique view can be included in the detail drawing without additional effort.

The use of CADIS-2D commands has no effect on the model of the object

within the computer, but merely affects the view shown on the screen.

To manipulate the 3D model, the user can choose between edge modification, plane modification and solid transformation. Solid transformation is particularly useful at the design stage, where variation of the spatial configuration of individual parts is required. Applications of these functions range from design of plane configurations representing simple lever systems up to definition of operating spaces occupied by industrial robots.

A hydraulic excavator is just as much a technical object as a single part in terms of representation by CADIS-3D. The transformation routines of CADIS-3D are an important tool for varying the positions of technical objects, permitting individual parts and complete assemblies to be shifted and rotated. In a work area, a part can be shifted from point to point or rotated about an axis perpendicular to the work area and defined by a point on it. An object can also be rotated about one of its edges.

Simple data management for complex data structures

The mapping of a real component within the computer in data structures is known as a 3D model. The various data elements in this model are structured and concatenated, i.e. combined into a multilayer hierarchical data network. The following hierarchy levels can be distinguished in the data structure:

- Solids,
- Surfaces of solids
- Edges of solids
- Points on solids

The 3D model for the part represented in Fig. 8 consists of

- 1 solid element,
- 6 surface elements (four plane surfaces, one outer cylindrical part surface),
- 12 edges (eight line sections, three circular arcs and one spline curve),
- 8 points of intersection and a number of reference points for the spline curve.

The geometrical elements are mutually defined by their relations. Surface F1, for example is defined by the three contour elements (edges) K1, K2 and K3. Every contour element is defined by two surfaces and every edge point (corner) by three contour elements. The surfaces are important, for they envelop the volume, represent the smallest functional unit in terms of design systematics and form the basis for production. The 1.0 version of CADIS-D3 handles objects defined by plane, cylindrical and conical surfaces.

CADIS data sets are stored in libraries in the form of ISAM (index sequential access method) files under the BS2000 operating system. The types of library available for CADIS-2D [2] are supplemented by an "object library" for CADIS-3D. The object libraries store the computer representations (3D models) of objects. The following three basic functions are available for handling these data sets:

• *Storage of a 3D model in the object library*

The 3D model is linked internally to its associated representations (drawings). When the 3D model is stored, the active 3D image is automatically filed as well. As many 2D images as desired can be stored for a 3D model.

- *Reading a 3D model to the main memory.*

The 3D mode and the associated 2D image required by the user are read to the main memory simultaneously. The representations specified during storage are displayed immediately.

- *Addition of a 3D model.*

Any 3D model stored can be added to the 3D model currently being processed. This makes it possible to build up libraries of standard parts, for example.

Easy, user-specific extension thanks to modular design

The CADIS-3D software package, like that of comparable systems, is standard CAD software, i.e. software which is not designed for a specific application and still has to be optimized for the individual user's tasks. It is thus important for a CAD product to be capable of adaptation to specific functions without major outlay. Applications illustrating this adaptability include producing alternative designs for engine shafts and progressive cutting tool design. CADIS is an open program system meeting the demand for user-specific extendibility [1].

As a rule, specific applications involve operations with form complexes (macros) of varying dimensions, some of them varying in shape as well, e.g. recesses for swivel parts, or components of a series. The user calls up a macro by specifying the desired dimensions with a special command (Fig. 10). A macro is defined in a programming language such as FORTRAN, hence the term "program micro" [5]. All CADIS functions may be called up on the FORTRAN level to define macros. The user-specific program may also contain special user subroutines for purposes such as strength calculations or access to files and data bases.

FORTRAN subroutine calls are available to access the CADIS data base for program extension, a procedure analogous to accessing CADIS functions. These access programs allow the addition, output, modification and erasure of details in the data base, which contains the plane and three-dimensional views of the object.

The two CADIS features mentioned – access in FORTRAN to functions and data base – are essential to efficient user-specific extension of a CADIS system in general and to selective application of the macro technique in particular. Efficient application-specific extensions are characterized by

- integration into the logic structure existing for design variations and modifications, and
- adaptation to an existing DP environment.

The macro technique is conducive to successful application of CAD and to economical production of drawings in particular. The macro technique described here also allows design and production planning work to be integrated to suit applications.

Interactive communication in line with the designer's requirements

If the preparation of schematic plans is disregarded, the primary function of CAD processes is obviously manipulation of the shape of technical objects, which is usually very complex. Several views and possibly sections as well are therefore required to produce an unambiguous representation of a mechanical part on a drawing. The human brain sets up the necessary relationship between the views. In terms of computer applications, this means:

A two-dimensional system replaces, in simplified terms, the drawing board. Digital processing of the shape of technical objects, however, is only possible with a three-dimensional system. 3D systems based on the volume model provide a much wider scope for computerization of design and production planning than is possible with the prevailing 2D systems. The question affecting current users of 2D systems most is that of continuous transition to the new 3D technology. This is best achieved if the 3D system makes provision from the outset for integration of the two-dimensional one.

Despite the wide variety of functions offered, the CAD systems available today are standard products. This situation is unlikely to change in the future, the high cost of development and maintenance of CAD systems being the overriding factor. However, the potential CAD user is quite justified in asking how to solve his specific problems with a standard software product.

CAD practice to date confirms that in many cases a CAD product cannot provide a viable, long-term solution until it satisfies the boundary conditions relating to design and production planning logic, the dp environment and user familiarization. The CAD product must be adapted to a given set of tasks, and this is ensured by an efficient macro technique and a clear interface with the data base.

Adaptation of CAD software is an essential step in the systematic preparation of computer-aided design systems

for deployment. But careful and well-timed training measures also play a role here. This is especially true of the introduction of 3D systems, whose effects on the designer's drawing technique will be of lasting benefit. They will not only relieve him of manual drudgery, but also help him give form to his thoughts. After all, what designer does not think in three-dimensional terms?

References

- [1] Gausemeier, J.: Rechnerunterstütztes Konstruieren im Dialog, data report 14 (1979), Sonderheft »Datenverarbeitung in der Industrie«, S. 37 bis 41
- [2] Softwareprodukt CADIS-2D. Kurzbeschreibung. Siemens AG, Bereich Datentechnik, München. Bestell-Nr. U 293-J-Z57-1
- [3] Softwareprodukt CADIS-3D. Kurzbeschreibung. Siemens AG, Bereich Datentechnik, München. Bestell-Nr. U 862-J-Z57-1
- [4] Gausemeier, J.: Eine Methode zur rechnerorientierten Darstellung technischer Objekte im Maschinenbau. Dissertation, TU Berlin 1977
- [5] Spur, G.; Gausemeier, J.: Eine Leitlinie zur Entwicklung von CAD-Programmsystemen. Z. f. wirtsch. Fertig. 73 (1978) S. 413 bis 419
- [6] Gausemeier, J.: Technische Aspekte für den erfolgreichen Einsatz von CAD-Systemen. Z. f. wirtsch. Fertig. 76 (1981) S. 282 bis 285

INDUSTRIAL TECHNOLOGY

BRIEFS

GRINDING WITH WATER JETS -- Fluid Engineering Products Ltd., Milton Keynes, England. This company was founded with the task of producing a series of products in the area of cutting and grinding with water jets. It was initially equipped with a stock capital of equivalently 0.7 million DM. Of this, 47 percent were supplied by the English and Caledonian Investment Ltd., a foundation of leading financial institutes for the purpose of financing new enterprises with risk capital. The remaining 53 percent belong to the British Hydromechanics Research Association (BHRA), which has already built prototypes of such a device. It emits a water jet, in which grinding agents are distributed. Thus, all types of materials can be cut under difficult or dangerous conditions, for example when the use of other units is prohibited because of the danger of explosion. The material can also be cleaned therewith. The first product is to be introduced into the market this summer. [Text] [Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German 20 May 83 p 7] 8348

CSO: 3698/383

SCIENCE POLICY

FRENCH PLAN FOR FUNDING INDUSTRIAL DEVELOPMENT

Plan Outlined

Paris AFP SCIENCES in French 26 May 83 pp 3-4

[Text] Paris--Creation of an account for industrial development. The Council of Ministers communique of 25 May announced that an Industrial Development Account (CODEVI) will be set up sometime this year.

CODEVI is intended to supply the Industrial Modernization Fund, which is itself an adjunct of ANVAR (National Agency for Valorization of Research).

The communique specified that every taxpayer and his spouse may open an account up to a fixed limit, 10,000 francs at the present time.

Interest on investments made to this account will be tax-exempt. This exemption will make it possible to reduce the cost of industrial financing. The money collected will be used for the following long-term loans to industrial corporations:

A minimum of 5 billion francs of the funds thus collected each year will be used to finance, through the Industrial Modernization Fund under ANVAR and chaired by the minister for industry and research, simplified participative loans at low interest rates and aid in the form of credit-leasing for industrial corporations.

The balance of such funds will make it possible for banks and establishments with legal status to develop their long-term loans to industry, as an extension of the effort already implemented in 1983.

The establishment of this account will make it possible to improve the financial terms for industry, innovative programs in particular, while reinforcing the trend toward long-term savings, as affirmed in the law of 3 January 1983 on development of investments and protection of savings.

Exemption of Direct Taxes for New Industrial Corporations

To strengthen the industrial recovery effort, the Council of Ministers has decided to ask parliament to grant new corporations various tax exemptions for 3 years.

With regard to the tax on corporate profits, a provision will be included in the 1984 financial appropriations bill for exemption to be applied to profits made in 1983 and taxable in 1984.

In the case of occupational tax, the land tax on improved property and various related taxes (tax for chamber of commerce and industry fees and tax for trade association fees), a legislative provision will henceforth be necessary to authorize local communities and consular agencies wishing to do so to grant exemption from the taxes which they collect.

Updating of Rental Values of Industrial Buildings

The new system of direct local taxes provides for the updating of property rental values every year.

In the case of property rental values of buildings and other fixed assets used for industrial purposes, the draft law proposes currently setting the updating coefficient at 1.08 for 1984.

Structure Detailed

Paris AFP SCIENCES in French 2 Jun 83 pp 3-4

[Text] Paris--Increased financial resources for Mr Fabius. Mr Laurent Fabius, minister for industry and research, will soon have available decidedly greater financial resources with the creation of the Industrial Development Account (CODEVI)* and the future Industrial Modernization Fund, with which two industrially oriented agencies, CODIS [Committee for Development of Strategic Industries] and CIDISE [Interministerial Committee for Development of Investments and Support of Employment], will be associated.

Confirming government aims, Mr Jacques Delors, minister of the economy, finance and budget, stated on 26 May that "regardless of the qualifications of Mr Fabius, the minister of industry formerly lacked the means to carry out his policy."

According to information received on that same date, the Industrial Modernization Fund, whose establishment has been announced for the coming weeks, will be administered by the National Agency for Valorization of Research (ANVAR), which is under the Ministry for Industry and Research, and funded by the new CODEVI savings account.

This fund will also include the administration of CODIS and CIDISE, two agencies specializing in financial aid to corporations and whose purse strings have thus far been held by the Ministry of Finance.

Mr Delors has said that this new structure will make possible "greater consistency of industrial policy and less dissipation of the government's effort." According to the economy minister, it will involve "helping, especially through participative

*See AFP SCIENCES No 358 of 26 May 1983, pp 3-4.

loans and no longer through subsidies, sectors specializing in the research and development of the latest technologies, in areas where the market does not give adequate signs of carrying the load."

CODEVI Details

According to Mr Delors, the Modernization Fund will have an annual budget of 5 billion francs, funded in the beginning, up to 3 billion francs, by the Deposits Fund and then by the Industrial Development Account (CODEVI).

According to the Ministry of Finance, CODEVI, which will be ready to operate by 1 October, should take the place of the "industrial savings account." According to Mr Delors, it will be a "new, simple and attractive way of saving, intended to attract new long-term savings without upsetting the current hierarchy of rates and investments."

"Very close" to the traditional savings account, the CODEVI account, of a compulsory nature, could be subscribed to, with possible withdrawal, in banks up to 20,000 francs per couple. Establishment of this investment's nontaxable interest rate, which could be about 11 percent per annum, according to financial circles, will depend on the final formula to be adopted following coordination with banking networks.

A reliable source reports that on a technical level, ANVAR will supplement its mission of encouraging innovation with the administration of participative loans.

ANVAR's New Resources

ANVAR, whose decidedly larger budget should amount to 820 million francs in 1983 (90 percent for aid to innovation and 10 percent for research subsidies) will thus reportedly supervise two financial agencies: CIDISE (Interministerial Committee for Development of Investments and Support of Employment) and CODIS (Committee for Development of Strategic Industries).

Their definitions could disappear in the Modernization Fund's implementing regulations.

According to a reliable source, CIDISE, formerly under the Ministry of the Budget, in 1982 granted 614 million francs in interest reductions on participative loans to industry, corresponding to a total amount of 3.7 billion francs in investments.

Under less discernable supervision, CODIS watched its loans and subsidies drop sharply in 1982, amounting to 250 million francs as opposed to 1.75 billion in the previous year.

Besides the sluggishness of the machinery, particularly in the case of waiting periods, one of the reasons cited at the Ministry for Industry and Research is the competition of the sectoral plans (data processing, textiles ...) put in place by the government.

11915

CSO: 3698/361

SCIENCE POLICY

LUND RESEARCH PARK TAKES SHAPE; FIRST COMPANIES MOVE IN

Stockholm SVENSKA DAGBLADET in Swedish 21 May 83 p 24

[Article by Per-Erik Landqvist]

[Text] Lund--Within a period of just over 10 years the Ideon Research Park will be constructed in Lund. The first stage of the project will include about 17,000 square meters of floor space. According to estimates, it will cost 85 million kronor.

As early as this fall the first occupants, Ericsson Radio System AB, will move into a temporary building.

"The research park will accommodate 20 to 30 companies. By the 1990's over 1,000 researchers will be employed at the park. In 3 or 4 years almost 400 development engineers and researchers will be employed there," said Governor Nils Horjel of Malmohus Province, who is chairman of the SUN Foundation (Foundation for Joint University-Industry Cooperation).

SUN is involved in all types of companies, but mostly with smaller ones. Horjel explained:

Growing Small Industries

"Growing small industries are needed in southern Sweden. They account for 37 percent in Malmohus Province. The large companies, i.e. the other 63 percent, are extremely vulnerable. This has been proven too many times. Just as in Smaland, we want smaller units."

But a giant corporation, Ericsson Radio System AB, will be the first to move in. On 1 September this company will move into what has been called the "incubator," a temporary building, until the 17,000 square meter research unit is constructed, beginning early next year.

"Ericsson Radio already has received many orders from abroad for its mobile telephone system. The company has high hopes for the future. In the United States alone there is a 20 billion kronor market for wireless communications systems," Nils Horjel pointed out.

Major Investment

Another large corporation, Perstorp AB with 4,500 employees and annual sales of 3 billion kronor, also has leased space at Ideon.

"We are making a major investment in Lund," the company's executive vice-president Sten Nordberg said. "In recent years we have developed into an international chemical and plastics company with several specialty products in relatively narrow fields. Eighty percent of our sales are made abroad and 60 percent of our production goes for exports."

The research park will be located on a 15 hectare area near Gambro in the north, Drago in the south, and the Technical University in the east. Skanska Cementgjuteriet developed the model for the first 17,000 square meters, at an estimated cost of 85 million kronor. Additional stages totalling about 50,000 square meters of floor space are being planned.

Tailor-Made

Governor Horjel said:

"This is a tailor-made project. The university will be close to reality, rather than isolated like an island."

Governor Nils Horjel of Malmohus Province and chairman of the SUN Foundation (Foundation for Joint University-Industry Cooperation) presented the Ideon Research Park and a model of the first stage during a presentation at Lund University on Friday.

9336

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SCIENCE POLICY

ERICSSON TO BE FIRST COMPANY IN LUND RESEARCH PARK

Stockholm NY TEKNIK in Swedish 19 May 83 p 16

[Article by Eva Martelius]

[Text] Lund--The research park in Lund has been christened "Ideon." It represents southern Sweden's hope for new jobs.

In the future, 5,000 researchers and engineers will find jobs there.

In addition, there will be 7,500 new jobs in various service fields.

Governor Nils Horjel also hopes that the park will inspire new industries to locate in crisis-riddled southern Sweden.

The project leaders behind the research park hope that it will make Lund a center of future research in biotechnology, electronics, and food technology. This September, Ericsson Radio Systems will be the first firm to move into the park.

SUN (Foundation for Joint University-Industry Cooperation), under the leadership of Governor Nils Horjel, is behind the project. On an area of 100,000 square meters east of the Technical University, the research park will provide space for the research units of large companies and for small firms.

There also will be room for "hybrids" or institutes where small and medium-sized companies can work together and have access to expensive technical equipment.

Rushed Through

After an initial presentation in February, the project was rushed through the municipal government and the first company will move in as early as September. Ericsson Radio Systems, which will establish a development unit in Lund, will concentrate on developing the next generation of mobile telephones for the international market.

The company estimates that within several years it will have 200 employees. This figure could grow to about 1,000 within 10 years. The company will have temporary quarters in portables from TV-2 in Stockholm. They will be set up and become the "incubator" of the research park.

Ground-breaking for the permanent research park will take place at the beginning of next year.

The idea behind the research park is that close cooperation between industry and the university will make development work more efficient and facilitate the recruiting of researchers by companies. By providing interesting work for researchers in Sweden, the project leaders hope to stop engineers from moving abroad.

Close Ties

"By hiring researchers for individual projects, we also will help the Technical University retain researchers, who otherwise would be lost to industry," said Einar Dahlin, local manager for Ericsson in Lund.

The firm already has developed close ties with several institutes in Lund, which will facilitate the establishment of the new branch.

Einar Dahlin sees the project as a development park where the companies' employees, both technicians and engineers, will receive help from university researchers on various projects.

In addition to Ericsson, Perstorp AB is ready to move in. Other large companies also have expressed interest.

"We are interested in companies that are looking to the future and are working in areas in which university researchers are active," said Ulf Andersson of SUN.

No production will take place at the research park. The goal will be to produce ideas to create new industries in southern Sweden.

Governor Nils Horjel, chairman of both SUN and Ericsson Radio Systems, hopes that this will provide new, secure jobs to replace jobs already lost in the shipbuilding, rubber, and textile industries.

All political parties in Lund except VPK (Left Party Communists) welcome the project, which could create 7,500 additional jobs in the service sector.

Right In Line

The research park is right in line with the government's priorities in Lund. For the first time, state funds will be invested to help companies work

together with researchers. Kemicentrum will undergo a 35 million kronor expansion, which will make Lund the largest food research center in Europe.

A neighbor of the research park, the Draco Pharmaceutical Company, also is planning a 100 million kronor expansion in its research unit. The successful Gambro Company also has reserved land in the northern part of the park.

It is the tough competition for highly trained workers that has compelled companies to locate near research facilities.

The growth of research parks is an international phenomenon. The United States was first, with such well-known examples as Silicon Valley and the so-called Research Triangle in North Carolina. Entire research cities are now being constructed in Japan and in Great Britain it is hoped that research parks will help such cities as Birmingham out of their present crises.

The idea of building a research park in Lund caught on after a visit last spring by Ian Dalton from Edinborough, who has 10 years experience in research parks.

9336

CSO: 3698/382

TRANSPORTATION

SWEDISH AIRCRAFT FLIES WITH ALL-COMPOSITE WINGS

Stockholm NY TEKNIK in Swedish 26 May 83 p 24

[Article by Karl G. Jonsson]

[Text] Sweden's first airplane with all-composite wings now has been tested in the air. The high-lift wing of a totally new type, which was described in NY TEKNIK just over 1 year ago, is undergoing final testing on an MFI-15 airplane in Linkoping.

"So far, the wing has fulfilled our most optimistic expectations, to say the least," said director Rudolf Abelin at Malmo Forsknings- & Innovations AB (MFI), which produced the wing as a research and development project in cooperation with the Board for Technical Development (STU).

The wing is constructed entirely of glass-fiber and carbon-fiber reinforced plastics. Its span is 3 meters longer than the wing normally used on the MFI-15. Despite this, both wings weigh about the same.

Low-Pressure Technology

MFI is utilizing a relatively inexpensive low-pressure technology to produce the composites used in the wing. Utilizing a vacuum, one man can form press a wing spar in 2 hours. Then the components are glued together to form a high-torsion unit.

So far, load tests have achieved 225 percent of the so-called safe load with no problems. Normally, the ultimate load is about 150 percent of the safe load.

New Type Of Wing

The aerodynamic design also is new. It is a high-lift wing with a typical low-speed profile. It has virtually cut the plane's take-off and landing distance in half, compared to the standard wing. Despite this, the cruising speed has been reduced by less than 5 knots or just under 10 km per hour.

The wing has an unusual cross section with a thick leading edge and an arched trailing edge consisting mostly of a spoiler. The wing nose is highly arched and looks blunt. This, combined with a so-called Fowler flap that can be

moved back and down, is responsible for the high performance of the wing. Even though the wing span is greater, the wing surface is the same as the standard wing on the MFI-15.

So far, a stalling speed, the minimum flying speed, of 34 knots has been achieved.

Utility Plane

The wing is purely a developmental project, but Rudolf Abelin believes it can be used in a new and larger type of aircraft for use in agriculture. In addition to a 2,000-liter spray tank, such a plane could carry eight passengers and 1 ton of equipment.

MFI already has plans for the Mulas, a versatile transport plane the size of a DC-3. It is a "work horse" designed primarily for commercial traffic in the Third World. This project, which also would include an all-composite sandwich design, is still waiting to be carried out.

"But Sweden today is well advanced in composite technology," Rudolf Abelin said.

Footnote: MFI is an offshoot of Malmo Flygindustri, the company behind the famous MFI-9 and MFI-15, which subsequently was incorporated into Saab's aeronautical division.



The first airplane wing on a Swedish power plane made entirely of glass-fiber and carbon-fiber composites now has been tested in the air. The test was made on an MFI-15 on which the usual wings were replaced with new wings by a team in Malmo under the leadership of the "father of the MFI," Rudolf Abelin.

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CSO: 3698/381

TRANSPORTATION

AI-BOEING CONFRONTATION, A-320 CONTROVERSY CONTINUE

Paris LE NOUVEL ECONOMISTE in French 6 Jun 83 pp 64-66

[Article by Philippe Gazier: Boeing, Airbus Eyeball to Eyeball]

[Text] Sales slipping, profits shrinking, and orders soft, the aviation industry is battenning down the hatches for 2 years of recession. In a murky future, though, Airbus Industrie's position seems to be a point or two above its rival's.

This isn't a show. It's a brawl. It's the latest Boeing-Airbus Industrie match to be fought at Le Bourget's 35th Aeronautics and Space Show, where the two giants will slug it out in a ring between the American space shuttle and the fragile ULMs (motorized gliders) against a backdrop of international aviation crisis.

Sales down, profits vanishing, orders iffy -- aloft, as elsewhere, hopes are pinned on innovation. And, for the European aviation industry, innovation is the ever-present problem of the plane of the future, the 150-passenger airliner, the A-320 that may swell the ranks of the Airbus family, thereby making sure that the giant in Seattle will not have a stranglehold on the complete-range market and, at the same time, that Aérospatiale and its partners will get a new lease on life.

There are now 550 second-hand aircraft (150 of them big liners) on sale at cut-rate prices, according to a release from the CFDT's Metalworkers on the state of the aviation industry. Industry order books world-wide show a trifle more than 2 years' work on hand and, since the production cycle for an airliner stretches over about 2½ years, it is starting to build aircraft for which there are no buyers in sight, just to keep its production lines running. If the slump continues, the industry is courting disaster.

"Two and a half years of guaranteed work for Airbus Industrie is a better margin for us than for our competitors," says company President Bernard Lathière. Airbus Industrie plants still have 120 planes to deliver out of 230 firm orders." Even so... In the

view of all the experts, 1983 is going to be a black year, and 1984 will be even blacker. After that, production should start to come back. That's why it is so important to be ready at the first sign of recovery.

The European consortium, which had moved up to the big-carrier league (with the 260-passenger Airbus A 300 B, and to the 200-seat A-310), must look now at consolidating its breakthrough onto the world market by offering other types of aircraft. Making a stab at the top of the line (jumbo liners carrying 450 or more passengers) seems to be out of the question right now, since Boeing has a truly formidable head start there, what with the 600 747s already sold (at the current price of around \$100 million) and its plans for a stretched version with 800 seats.

On the other side of the coin, the narrow-body jet sector seems to be within the more comfortable reach of the European builders, even though they have yet to come up with a second generation of their Caravelle and BAC111, or yet their Trident.

So what's actually going on right now? McDonnell-Douglas and Boeing are selling new versions of the DC 9 and the Boeing 737 (count on each of those models: a million planes). And the two American makers of civilian airliners still in the running (Lockheed is halting construction of its big Tristars and thus is no longer interested in the airlines as customers) have every reason to stretch out their model production as long as possible, as Boeing did with its triple-jet 727, its all-time best seller, of which the last planes will come off the lines in 1984 (bringing the model total to 1,831 planes).

After some hesitation between a 130-seat and a 160-seat model, the Airbus Industrie partners finally settled on a 150-place liner. It will be the Airbus A 320, which may be certified by 1988. "Preliminary development is continuing," says Aérospatiale General Manager Yves Barbé. But, while the A 320 is making a good showing on Aérospatiale vendors' books, there is no talk of taking it seriously in the Prime Minister's public remarks. One consolation: the design and performance levels of the aircraft have been finalized, and the firm prices have been set.

On the hardware side, the current partners in Airbus Industrie, Aérospatiale, British Aerospace, Messerschmidt Bülow Blohm (MBB) and the Spanish Casa, have already completed plans for sharing the work. There is a possibility of broadening the operation with the admission of the Australians, Canadians, Italians, and Dutch, etc., without any threat to the existing corporate structure because, as General Jacques Mitterrand emphasized a few days ago, on the eve of stepping down as president and CEO in favor of Mr Jean Martre, the new Aérospatiale president: "The one thing we must not do is tamper with the consortium's industrial configuration." So the British will do the wings, the Germans the fuselage sections, the nose and especially the final assembly and flight testing will be done by the French (at Toulouse). Same drill as for the big A 300 and A 310.

Begun early this spring, the sales campaign is now well under way. Several companies are showing an interest in the A 320 plan. Not only Air France (which says it will place 25 firm orders and take 25 options) and Air Inter (ten plus ten), but also some foreigners: Australian, Finnish, Scandinavian, and British as well, including British Caledonia, already an A 310 customer, but British Airways itself, which will have to replace 60 or so BAC 111s and Tridents within the next few years...

Savings in View

No question but that the 320s' chances would be better with British Airways if their engines came from Rolls-Royce. That, however, is not to be, at least for the first few years of the program.

The fact is that the European 150-passenger airliner is offered with a new version of the CFM 56 jet engine (the hyphen-4 version) which bears the hyphenated name of General-Electric-Snecma, which are partners within CFM International. This is an engine," according to Snecma President and General Manager Jacques Benichou, "that will have a development cost of only 15 to 20 percent of the price of a wholly new one, and that will afford us the opportunity of substantial operating economy." It is also the only engine to be offered on today's market, because the design plan announced by the Derby coalition (Rolls-Royce, Pratt & Whitney, plus two more European and three Japanese companies) is not yet completely defined.

On the matter of the engines, as well, Airbus is facing off Boeing which, after having tested the CFM 56-2 on a 4-jet 707, is installing it on a production-line basis in USAF KC-135 supply planes now getting new replacement engines.

And, even as it displays the impressive references of the re-motorized DC 8s, photographs to back them up, Boeing is encountering some success these days with its "Big Bertha": the twin-jet 727 equipped with CFM 56-3a. One version, with 140 seats promises fuel economy on the order of 21 percent per seat over the 737-200 powered by Pratt & Whitney JT 8 D jets the ones Air France has begun bringing on line).

The rub, though, is that Boeing is not at all anxious for the Europeans to start their operation 320 too early. "There is still no market for a 150-passenger plane," argues Mr Tex Boullioun, who heads Boeing's civil aviation division. "In any case, should the Europeans decide to go ahead, we'll be able to give as good as we get. We need a year to a year and a half less than they do to bring out a new plane. Four years will be enough for us."

True it is that, in the summer of 1978, when Airbus had decided to launch the A 310s, the response was swift in coming: a month later Boeing began its 767 program, and the first ones off the

THE KEY FIGURES FOR THE FRENCH AVIATION INDUSTRY

| | |
|--|----------|
| Direct jobs (in thousands) |116 |
| Indirect jobs (in thousands) (suppliers and subcontractors) more than..... | 230 |
| Turnover in 1982, 32 percent in sales to the State and 60 percent in export sales (in billions of francs)..... | 52 |

4,400 Airliners to Build Outlook for the Civil Aircraft Market 1983-1995

| Main categories | Maker and type | Predictable market share, now to 1995 | Value in \$Billions 1983 |
|--|---|--|-----------------------------|
| Under 125 seats, short routes | Boeing 737-200 Douglas DC9-30 | 3% | 5 |
| 125-150 seats short and me- dium routes | Boeing 737-300 Airbus A320 Douglas DC9-80 Boeing 727-200 Boeing 7 x 7 | 18% | 35.8 |
| 150-300 seats short, medium, long routes | Boeing 757 Boeing 767 Airbus A 310 Airbus A 300 Airbus TA 9 (?) * Airbus TA 11 (?) * | 47% | 90.3 |
| More than 300 seats, long routes | DC 10 30/40 Boeing 747 | 32% | 61.8 |
| | | | 192.9 |

More aircraft will be built in the next 15 years than in the past 30. From 1952 to 1962, \$166.1 billion 1983 dollars' worth of airliners were sold.

Source: Boeing.

* [as published]

line, earmarked for United Airlines, were in operation in the fall of 1982. Lufthansa and Swissair brought their first A 310s on line last April. Even so, the sales score between the two rivals is honorable indeed for Airbus Industrie: Boeing sold 175 of its 767s, 105 of them to American companies while 102 A 310s were sold to 15 carriers on four continents. That works out to 36.8 percent of the 200-passenger market covered by the Europeans.

Is it realistic to dream of a comparable market share for a 150-passenger plane? Mr Lathière is not worrying about taking on Boeing. "We have just won two defensive battles, one in Kuwait, and a tougher one in Thailand. Once the recovery is established, we'll shift to the offensive again."

To get the A-320 into orbit, Airbus Industrie promoters will have to round up customers, but also to find money. And persuade their oversight authorities to advance them a total of close to \$2 billion. That's the first obstacle. For the nonce, France is the only country that seems to be backing the project. The proposal is on the back burner in Germany, and in Britain it will have to wait until the elections are over.

The whole game may well be played out over the matter of financing for sales, until such time as the aviation companies can show a cleaner bill of health. McDonnell Douglas (missing from Le Bourget this year for the first time) threw a monkey-wrench into the plan last fall, when it suggested leasing, rather than selling some aircraft (20 twin-jet DC 9-80s for American Airlines and 15 for TWA) in a go-for-broke move. "Isn't the most important thing during a recession to keep on building airplanes?" asked Douglas Aircraft Company President James Worsham. "Besides," he added, "of the 84 orders taken last year, only 35 were for leases."

That meant, of course, that Boeing had to come right up with a similar offer to another major US carrier, Delta, for 33 Boeing 737-200s. And the builders' position is steadily weakening. "Should American Airlines decide one evening to return its planes to Douglas," warns Mr Bouillioun, "it can bring Boeing to its knees that very night."

Airbus Industries' goal for 1985 was to build a total of 65 A-300 and A-310 aircraft, which, practically speaking, would come to six aircraft per working month. Its executives have calculated since that it would be wiser to hold that level to five per month until new orders come in. In other words, when the time is ripe to start talking again, very seriously, about the 150-seat plane.

And so, once again, Airbus finds itself up against Boeing's flexibility. Boeing has considerably slowed its production lines (the huge plants at Everett, near Seattle, built to assemble the 747 and the 767, are half empty), and its payroll is expected to shrink still further come the end of the year.

Boeing, claims Mr Boullioun, can afford to build only six planes per year of each type without thereby compromising its operating budget. That level of flexibility is what is liable to be missing, despite the joint venture formula, for the industry partners in Airbus Industrie. Even so, it is nicer to have a \$192-billion pie to split two ways between now and 1985 than to have to slice it into three or even four pieces, as happened last year.

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CSO: 3698/335

TRANSPORTATION

UPDATE ON BRITISH 'ADVANCED TURBOPROP' COMMUTER PROGRAM

Gelsenkirchen AEROKURIER in German Jul 83 p 762

[Text] British Aerospace is already represented in the regional air traffic market with the 19 seater Jetstream 31, the 40 seater HS 748, and the 88 to 106 seater four-jet BAe 146. It plans to round out this program with the 64 seater ATP (advanced turboprop) which combines the proven parts of the HS 748 with a new technology.

The fuselage will be extended to 26 m, and will receive significantly more port-holes. Both front and rear, there will be a passenger door and separate freight doors, and this will minimize ground time. The nose of the ATP will be more streamlined, and a new, tapered rudder unit is used. The most modern systems will be installed in the cockpit, such as screen displays and digital avionics.

The main innovation, however, is the propulsion system. Two 1879 kW (2520 shp) Pratt & Whitney PW 124s will replace the Rolls Royce Dart that is used in the HS 748. They will drive advanced six-blade propellers, that were developed by Aerospace Dynamics and Hamilton Standard, which will contribute considerably to noise reduction. According to information from BAe, all these improvements make the ATP an extremely economical aircraft, whose operating costs per flight kilometer correspond approximately to those of the smaller 50 to 60 seater turboprop aircraft. However, their cost per seat-kilometer is comparable to those of the nearly twice as great jet aircraft. Already with 22 passengers on board, the ATP is supposed to be able to fly profitably. At the present time, the detail development of ATP is being financed by internal means.

This development has been concluded about halfway in the Manchester Division of British Aerospace and the construction of a mock-up has begun. A final decision to build a new aircraft is expected within the next two to three months. The first flight will then take place in 1986, and the first delivery in 1987. BAe expects, during the next ten years, a demand of 600 aircraft of the size of the ATP, and is striving for a market fraction of about one third, especially since the aircraft at the moment has no direct competition, since Fokker is evidently still delaying with a corresponding expansion of the F27.



The 64 seater ATP has been developed from the HS 748. With this aircraft, British Aerospace wants to round out its civil aircraft program. The initial flight could take place in 1986.

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TRANSPORTATION

INTERNATIONAL AIRCRAFT ENGINE CONSORTIUM OFFICIALLY FORMED

Frankfurt/Main FRANKFURTER ZEITUNG/BLICK DURCH DIE WIRTSCHAFT in German
7 Jul 83 p 7

[Text] Contracts for establishment of the International Aero Engine Company (Iaec) will be signed in about four to six weeks, according to an announcement by the chairman of the board of the Engine and Turbine Union [MTU], Ernst Zimmermann. Purpose of the new organization will be to develop a new engine for the medium range aircraft market. An appropriate contract for cooperation was signed in March by MTU, Pratt and Whitney (United Technologies), Rolls-Royce, Mitsubishi, Kawasaki and IHI. According to present discussions the company headquarters will be in Switzerland. The consortium believes that the engine can be developed by the beginning of 1989 and estimates its market share in the year 2000 as more than 50 percent, based on a market volume of approximately 3000 short and medium range aircraft. Development costs are estimated as \$1.5 to 2 billion. The new engine will use about 14 percent less fuel than the most modern engines of this size in use today; it will be capable of developing a thrust of 20,000 to 30,000 pounds.

The new engine will, according to statements by Pratt and Whitney, use the latest technology embodied in the RJ-500 engine made by the Japanese companies, in which Rolls-Royce participated, as well as the PW 4000 and PW 2037 engine developments of Pratt and Whitney, MTU and Fiat. The new AI 2500 engine will be built as a cooperative effort.

Participants in the consortium still have to wait for approval from appropriate government agencies and from trust agencies. Zimmermann expressed the view that the Bundeskartellamt in Berlin would be supportive. The consortium also expects the consent of the U.S. anti-trust authorities.

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Sept. 7, 1983